

REMARKS/ARGUMENTS

The Office Action contained rejections of the claims under 35 USC §§112 and 103, and an objection to the drawings under 37 CFR 1.83(a). Each will be responded to below.

a. Response to Rejections of Claims Under 35 USC §112

Claims 1-20 were rejected under 35 USC §112, first paragraph, as failing to comply with the enablement requirement. For the reasons explained below, Applicant respectfully traverses the rejection.

In advancing the rejection, the Examiner stated:

Claims 1 and 14 claim a "straight-wire element" however the specification does not describe this element sufficiently to enable [one] skilled in the art to make and/or use the invention. Applicant only states (page 4, line 27-page 5, line 1) that the term is used to distinguish from a coil, however it is unclear how the device would then work. In order to provide a current through the "straight-wire" element to produce an electromagnetic field there needs to be a closed circuit, while a straight-wire would provide an open circuit. Should the wire element have a return path to complete the circuit you would then include a single loop coil."

Applicant respectfully disagrees. To begin with, the terms "coil" and "circuit" are not synonymous. By definition, a coil is a part of a circuit, but a circuit is not necessarily a coil:

Coil...3. *Elect.* a. A wound spiral of two or more turns of insulated wire, used to introduce inductance into a circuit. (Webster's II, *New College Dictionary*, Houghton Mifflin Company)

In other words, even though all circuits must be closed electrically in order to work, that doesn't mean that they are all "coils" in an accepted sense of the term.

Applicant's "straight wire element" does not include "two or more turns" of wire, and is therefore not a coil, but it nevertheless generates a magnetic field. It is well known that any wire having current flowing through it will produce a magnetic field, through what is known as "parasitic inductance." A coil, classified as a "lumped-element inductor", is a discrete device that is mounted in a circuit to create induction in addition to parasitic inductance.

As can be seen in FIG. 4, Applicant's output circuit does not include any coil/lumped-element inductor whatsoever. Instead, Applicant's device employs only the parasitic inductance of the straight, unwound element to generate the effective magnetic field, which, as is explained in Applicant's specification, makes possible a greatly increased speed of operation.


As for the assertion made in the Office Action that it is unclear how the device would work because "a straight-wire would provide an open circuit", Applicant's claims include an element expressly reciting that the apparatus also comprises a circuit for supplying current pulses to the straight-wire element. Applicant's circuit is therefore "closed" electrically so as to create current flow, but, as discussed above, this does not mean that it constitutes a "coil".

In summary, Applicant's specification and drawings accurately describe and depict an output circuit having a straight-wire element. (It will be understood, for the reasons discussed above, that in this context the term "straight" means that the wire is not wound into a spiral coil or otherwise include a lumped-element inductor, not that it is necessarily rectilinear or perfectly "straight" in a geometric sense.) The circuit is shown and described as being closed electrically in order that current will flow through the straight-wire element, so that the magnetic field will be produced by parasitic inductance in the straight-wire element. However, simply because the circuit is closed does not mean it constitutes a "coil" or other lumped-element inductor.

Accordingly, Applicant respectfully submits that the straight-wire element is sufficiently described to enable one skilled in the art to make and use the invention. Applicant therefore requests that the rejection of claims 1-20 under 35 USC §112, first paragraph, be reconsidered and withdrawn.

b. Response to Objection to Drawings Under 37 CFR 1.83(a)

The drawings were objected to under 37 CFR 1.83(a), on grounds that "the straight-wire element must be shown or the feature(s) cancelled from the claim(s)."

Applicant respectfully traverses the objection. As was explained above, FIG. 4 accurately shows the main circuit (82) as having a straight-wire element, which is not wound into a coil. Moreover, the accepted symbol for a coil () appears nowhere in the drawing of the circuit.

The drawings therefore show every feature of the invention specified in the claims. Accordingly, Applicant respectfully requests that the objection to the drawings under 37 CFR 1.83(a) be reconsidered and withdrawn.

c. Response to Rejections of Claims Under 35 USC §103

(i) Response to rejection of claims 1-8, 11 and 14 over *Tepper et al.*

Claims 1-8, 11 and 14 were rejected under 35 USC §103(a) as being unpatentable over *Tepper et al* (US 6,132,362). For the reasons explained below, Applicant respectfully traverses the rejection.

In order to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claim limitations (MPEP 2143). However, *Tepper* fails to teach or suggest a straight-wire element that generates a magnetic pulse, which element is expressly required by independent claims 1 and 14 and their respective dependent claims 2-13 and 15-20.

As was explained above, the circuit of the claimed invention utilizes a straight-wire element to produce the magnetic field, without a coil/lumped-element inductor. *Tepper*, by contrast, shows a device in which the magnetic field is generated by a transducer coil (36) having multiple windings. In fact, *Tepper's* entire invention is centered on recovering energy in the coil at the end of the pulse (e.g., see col. 2, lines 3-7); since very substantial energy is required to energize *Tepper's* coil, it makes sense to try to recover some of that energy. By comparison, Applicant's circuit employs only parasitic inductance and therefore recovery of energy is of no consequence (in point of fact, Applicant's device has been demonstrated to operate for an excess of 30 hours on a single 9-volt battery, with more power being consumed by the low-power LED indicator than by the output circuit).

Tepper therefore does not teach or suggest generating the operative magnetic field using a straight-wire element. Moreover, it would not be obvious to modify *Tepper* to use such an element, since to do so would defeat the entire purpose of the *Tepper* invention, i.e., to provide a transducer coil and a circuit for recovering "fly back" energy from the coil.

With respect to claims 8 and 15-19, Applicant further traverses the assertion in the Office Action that:

"while *Tepper et al* does not teach the specific ranges as claimed, it would have been obvious to one skilled in the art at the time the invention was made, to discover the optimum or workable ranges by routine experimentation."

Because the *Tepper* device is based on a multiple-winding transducer coil, it is, to the best of Applicant's knowledge, incapable of operating in the ranges recited in Applicant's claims. As is explained in Applicant's specification, such coils have high inductance and are constrained to slow ramp times. As a result, the pulses generated by the *Tepper* device are in the microsecond range, as opposed to the nanosecond range in the present invention (millionths vs. billionths). For example, FIG. 9 of *Tepper* shows a pulse wave of about 70 microseconds and a rise time of about 5-10 microseconds, which is roughly 500 times slower than in the present invention. To illustrate this point, Applicant has attached a graph of the first part of the *Tepper* pulse waveform, plotted on a nanosecond scale and compared with the pulse waveform of the claimed invention (Attachment A); as can be seen, the pulse produced by the *Tepper* device has an extremely slow rise time and a vastly longer duration as compared with that produced by the present invention. While it might be possible for the *Tepper* device to be modified to produce somewhat faster rise times and shorter pulses than what is shown in FIG. 9, to the best of Applicant's knowledge it would not be possible (at least within the confines of existing technology) to reduce those times by a factor of 500-1000 so as to be within the ranges of the present invention; in any event, such ranges could not be achieved by routine experimentation using the device of *Tepper et al*.

Accordingly, Applicant respectfully submits that *Tepper et al* fails to show generating the magnetic field using a straight-wire element, as is expressly required by independent claims 1 and 14 and their dependents claims. Moreover, it would not be obvious to modify the *Tepper et al* device to meet the range requirements of claims 3-8 and 15-19. Applicant therefore respectfully submits that *Tepper et al* does not support a *prima facie* case of obviousness against Applicant's claims 1-20, and requests that the rejection under 35 USC §103(a) be reconsidered and withdrawn.

(ii) Response to rejection of claims 12-13 over *Tepper et al* in view of *Mawhinney*

Claims 12-13 were rejected under 35 USC §103(a) as being unpatentable over *Tepper et al* over *Mawhinney*. Applicant respectfully traverses this rejection as well.

As was discussed above, *Tepper et al* fails to show generating the magnetic field using a straight-wire element, as is required by Applicant's claims. The secondary reference (*Mawhinney*) was cited only as showing a plurality of devices used together to treat a larger area. *Mawhinney* employs RF/microwave waves radiated from spiral antennae, and adds nothing to *Tepper et al* that would teach or suggest the required limitation.

Accordingly, *Tepper et al* in combination with *Mawhinney* fail to teach or suggest all of the limitations of Applicant's claims. Applicant therefore respectfully submits that the references fail to establish a *prima facie* case of obviousness, and requests that the rejection of claims 12-13 under 35 USC §103(a) be reconsidered and withdrawn.

d. Conclusion

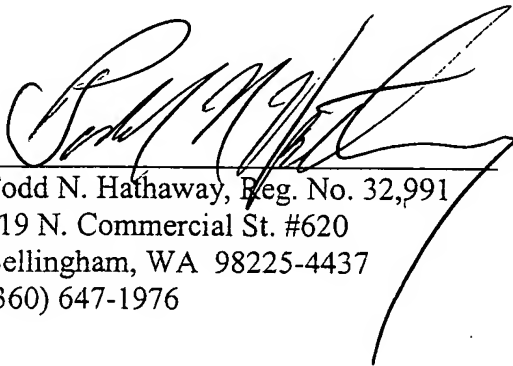
Applicant respectfully requests reconsideration of the present application in view of the amendments and remarks set forth herein. It is believed that the claims are now in condition for allowance. If there is any matter that can be expedited by consultation with Applicant's attorney, such would be welcome. Applicant's attorney can normally be reached at the telephone number given below.

Signed at Bellingham, County of Whatcom, State of Washington this 23rd day of August 2005.

Respectfully submitted,

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